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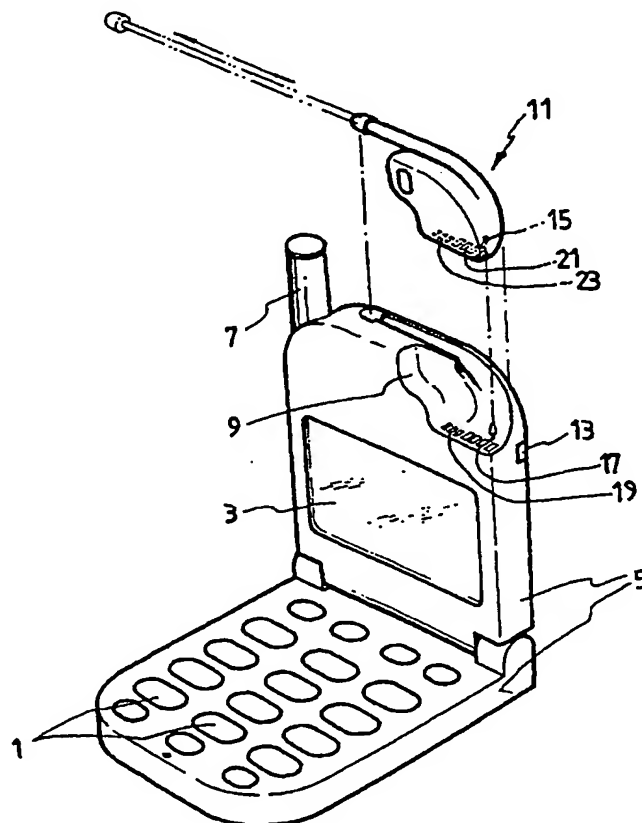
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Published*With international search report.**With amended claims.**In English translation (filed in Korean).*

(54) Title: MOBILE TELEPHONE WITH WIRELESS EARPHONE/MICROPHONE

(57) Abstract

A mobile telephone comprising a main transmitter (29) for transmitting an audio signal at a first frequency, a main receiver (31) for receiving an audio signal at a second frequency, a communication signal processor (33) for processing a voice from the user, outputting the resultant audio signal to the main transmitter and processing the audio signal received by the main receiver to convert it into an audible signal, an auxiliary transmitter (35) for transmitting the audio signal processed by the communication signal processor at a third frequency, a wireless earphone/microphone device (39) for receiving and demodulating the audio signal from the auxiliary transmitter, outputting the resultant voice to the user, modulating the voice from the user and transmitting the resultant audio signal at a fourth frequency, and an auxiliary receiver (37) for transferring the audio signal transmitted from the wireless device (39) to the processor (33).



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MOBILE TELEPHONE WITH WIRELESS EARPHONE/MICROPHONE

Technical Field

5 The present invention relates in general to a mobile telephone with a wireless earphone/microphone, and more particularly to a mobile telephone wherein an earphone and a microphone are located remotely from the body of the mobile telephone in such a manner that they can be wirelessly
10 connected to the telephone body, thereby allowing the user to freely conduct a telephone conversation over the earphone and microphone.

Background Art

15

As well known to those skilled in the art, mobile telephones are adapted to provide a personal communication service at a frequency band of 1.8GHz. Because such mobile telephones are able to rapidly accommodate information, the
20 demand for them is recently on a gradually increasing trend. Further, so far as a subscriber's personal telephone number is set in such a mobile telephone, the subscriber can conveniently and rapidly exchange messages with a different mobile telephone as well as a general telephone by
25 establishing a telephone call connection between his mobile

telephone and the general telephone or different mobile telephone. As a result, such mobile telephones are recently on a trend of being abruptly widened in utilization.

Such a conventional mobile telephone has a receiver
5 (referred to hereinafter as an 'earphone') and a transmitter (referred to hereinafter as a 'microphone') formed in its body integrally therewith or removed from the body and connected thereto via wires.

However, the former is disadvantageous in that it is next
10 to impossible for the user to view a message displayed on a display unit of the mobile telephone while speaking over the mobile telephone. The latter has been proposed to overcome this problem with the former and is desirable in that the user can view a message on the display unit of the mobile telephone
15 while speaking over the mobile telephone using the microphone and earphone, but disadvantageous in that the wires connecting the earphone and microphone to the telephone body limit a sphere of action of the user or makes the action itself unnatural, thereby raising an inconvenience in use.

20

Disclosure of the Invention

Therefore, the present invention has been made in view of the above problems, and it is an object of the present
25 invention to provide a mobile telephone with a wireless

earphone/microphone wherein the earphone and microphone are located remotely from the body of the mobile telephone in such a manner that they can be wirelessly connected to the telephone body, thereby allowing the user to freely conduct a
5 telephone conversation over the earphone and microphone.

In accordance with an aspect of the present invention, the above and other objects can be accomplished by a provision of a mobile telephone comprising a power supply for supplying predetermined direct current power to the mobile telephone, a
10 main transmitter for transmitting an audio signal to an external mobile switching center at a first frequency, a main receiver for receiving an audio signal from the mobile switching center at a second frequency, and a communication signal processor for processing a voice from the user,
15 outputting the resultant audio signal to the main transmitter, detecting the audio signal from the mobile switching center from the main receiver and processing the detected audio signal to convert it into an audible signal, wherein the mobile telephone further comprises an auxiliary transmitter
20 for transmitting the audio signal from the main receiver processed by the communication signal processor at a third frequency; wireless earphone/microphone means located at a remote site from the auxiliary transmitter and wirelessly connected thereto, the wireless earphone/microphone means
25 receiving and demodulating the audio signal transmitted from

the auxiliary transmitter, outputting the resultant voice to the user, modulating the voice from the user and transmitting the resultant audio signal at a fourth frequency; and an auxiliary receiver for receiving the audio signal transmitted
5 from the wireless earphone/microphone means and transferring it to the communication signal processor.

Preferably, the wireless earphone/microphone means may include a remote receiver for receiving the audio signal transmitted from the auxiliary transmitter; an audio signal
10 processor for demodulating the audio signal received by the remote receiver, processing the demodulated audio signal as a voice and modulating the voice from the user at the fourth frequency; a remote transmitter for transmitting the audio signal modulated by the audio signal processor at the fourth
15 frequency; an earphone for outputting the voice processed by the audio signal processor to the user; a microphone for converting the voice from the user into an electrical signal and transferring the converted electrical signal to the audio signal processor; and a charging circuit for charging itself
20 with the power from the power supply and supplying the charged power to the remote transmitter, remote receiver, audio signal processor, earphone and microphone as needed.

In accordance with another aspect of the present invention, there is provided a mobile telephone having a flip-
25 type body including a main transmitter, a main receiver and a

communication signal processor, comprising audio input/output means installed in the body in such a manner that it is detachable from the body and movable to a desired remote site, the audio input/output means including a remote transmitter, a remote receiver, an audio signal processor, a microphone and an earphone; a depressed seat formed at a desired portion of the body for receiving the audio input/output means; and a stopper formed at a desired portion of the depressed seat for selectively attaching or detaching the audio input/output means to or from the seat.

The mobile telephone further comprises a plurality of first power terminals formed at desired portions of the depressed seat for supplying power to the audio input/output means; and a plurality of second power terminals formed respectively at the opposite portions of the audio input/output means to the first power terminals to be electrically contactable with the first power terminals to receive the power therefrom.

Preferably, the auxiliary transmitter and auxiliary receiver may be connected to a speaking system in at least one of a movable body and a fixed body of a wireless telephone and the wireless earphone/microphone means may be detachably installed in a desired portion of the movable body.

Alternatively, the auxiliary transmitter and auxiliary receiver may be connected to a speaking system in a wired

telephone and the wireless earphone/microphone means may be detachably installed in a desired portion of the wired telephone.

5 Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in
10 conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view showing the exterior appearance of an embodiment of a mobile telephone with a wireless earphone/microphone in accordance with the present invention;

15 Fig. 2 is a perspective view showing the exterior appearance of an alternative embodiment of the mobile telephone with the wireless earphone/microphone in accordance with the present invention; and

Fig. 3 is a block diagram, in detail, showing the
20 construction of the mobile telephone with the wireless earphone/microphone in accordance with the present invention.

Best Mode for Carrying Out the Invention

25 Fig. 1 is a perspective view showing the exterior

appearance of an embodiment of a mobile telephone with a wireless earphone/microphone in accordance with the present invention. As shown in this drawing, the mobile telephone comprises a body 5 of two parts, one part including a key input unit 1 for inputting a telephone number and other commands desired by the user and the other part including a display unit 3 for providing the user with a visual indication of the operating state of a system based on the input by the key input unit 1. The two body parts are hinged to each other by a hinge pin (not shown). The second body part further includes an antenna 7 for transmitting and receiving signals at a mobile telecommunication frequency band. This type of mobile telephone is called a flip type.

At a desired portion of the second body part is formed a seat 9 depressed in a similar shape to the inside of the ear for receiving a detachable audio input/output device 11. The audio input/output device 11 may preferably include a remote transmitter, remote receiver, audio signal processor, microphone, earphone and charging circuit, as will be mentioned later in detail. Further, the audio input/output device 11 is removable from the depressed seat 9 and movable to a desired remote site. A stopper 13 is formed at a desired portion of the depressed seat 9 to selectively attach or detach the audio input/output device 11 to or from the seat 9. A slot 15 is formed at the opposite portion of the audio

input/output device 11 to the stopper 13 to lock it.

A plurality of first power terminals 17 are formed at the bottom of the depressed seat 9 to supply power to the audio input/output device 11. A first signal terminal 19 is formed
5 at a portion of the depressed seat 9 adjacent to the first power terminals 17 to input and output audio signals from/to the audio input/output device 11. A plurality of second power terminals 21 are formed respectively at the opposite portions of the audio input/output device 11 to the first power
10 terminals 17 to be electrically contactable with the first power terminals 17 to receive the power therefrom. Similarly, a second signal terminal 23 is formed at the opposite portion of the audio input/output device 11 to the first signal terminal 19 to be electrically contactable with the first
15 signal terminal 19 to input and output the audio signals from/to it.

Fig. 2 is a perspective view showing the exterior appearance of an alternative embodiment of the mobile telephone with the wireless earphone/microphone in accordance
20 with the present invention. Some parts in this drawing are substantially the same in construction as those in Fig. 1 and the same parts are thus designated by the same reference numerals.

As shown in this drawing, the mobile telephone comprises
25 a body 5 having a rectangular casing shape. The body 5

includes a key input unit 1 for inputting a telephone number and other commands desired by the user, and a display unit 3 formed over the key input unit 1 for providing the user with a visual indication of the operating state of a system based on the input by the key input unit 1. The body 5 further includes an antenna 7 installed in its top portion for transmitting and receiving signals at a mobile telecommunication frequency band. This type of mobile telephone is called a bar type.

10 An audio input/output device 11 is attached to the body 5 in such a manner that it is removable from the body 5 and movable to a desired remote site. The audio input/output device 11 may preferably include a remote transmitter, remote receiver, audio signal processor, microphone and earphone, as
15 will be mentioned later in detail. An earphone 47 is formed at one end of the audio input/output device 11 and a microphone 49 is formed at the other end of the audio input/output device 11. A plurality of first power terminals 17 and a first signal terminal 19 are formed respectively at
20 the opposite portions of the body 5 to a plurality of second power terminals 21 and a second signal terminal 23, which are provided between the earphone 47 and the microphone 49. A speaker 25 is provided at a contactable portion of the body 5 with the earphone 47 to output a received voice to the user
25 when the audio input/output device 11 is attached to the body

5.

Fig. 3 is a block diagram, in detail, showing the construction of the mobile telephone with the wireless earphone/microphone in accordance with the present invention.

5 As shown in this drawing, the mobile telephone comprises a power supply 27 for supplying predetermined direct current (DC) power to the mobile telephone, a main transmitter 29 for transmitting an audio signal to an external mobile switching center at a first frequency, a main receiver 31 for receiving

10 an audio signal from the mobile switching center at a second frequency, a communication signal processor 33 for processing a voice from the user, outputting the resultant audio signal to the main transmitter 29, detecting the audio signal from the mobile switching center from the main receiver 32 and

15 processing the detected audio signal to convert it into an audible signal, an auxiliary transmitter 35 for transmitting the audio signal from the main receiver 31 processed by the communication signal processor 33 at a third frequency, and a wireless earphone/microphone device 39 located at a remote

20 site from the auxiliary transmitter 35 and wirelessly connected thereto. The wireless earphone/microphone device 39 is adapted to receive and demodulate the audio signal transmitted from the auxiliary transmitter 35, output the resultant voice to the user, modulate the voice from the user

25 and transmit the resultant audio signal at a fourth frequency.

An auxiliary receiver 37 is further provided in the mobile telephone to receive the audio signal transmitted from the wireless earphone/microphone device 39 and transfer it to the communication signal processor 33.

5 The wireless earphone/microphone device 39 includes a remote receiver 41 for receiving the audio signal transmitted from the auxiliary transmitter 35, an audio signal processor 45 for demodulating the audio signal received by the remote receiver 41, processing the demodulated audio signal as a
10 voice and modulating the voice from the user at the fourth frequency, a remote transmitter 43 for transmitting the audio signal modulated by the audio signal processor 45 at the fourth frequency, an earphone 47 for outputting the voice processed by the audio signal processor 45 to the user, and a
15 microphone 49 for converting the voice from the user into an electrical signal and transferring the converted electrical signal to the audio signal processor 45. A charging circuit 51 is further included in the wireless earphone/microphone device 39 to charge itself with the power from the power
20 supply 27 and supply the charged power to the remote transmitter 41, remote receiver 43, audio signal processor 45, earphone 47 and microphone 49 as needed.

On the other hand, the mobile telephone with the wireless earphone/microphone of the present invention is applicable to
25 a general wireless telephone and wired telephone.

In other words, the general wireless telephone includes a fixed body connected to a switching center of a communication company by wire and a movable body capable of communicating with the fixed body wirelessly only within the range of a predetermined distance therefrom. In this regard, the wireless earphone/microphone device of the present invention may be detachably installed in either the movable body or fixed body of the wireless telephone and have the almost same effect.

Further, the general wired telephone includes only the fixed body, except for the movable body of the wireless telephone, to which a transmitter and receiver integral with each other are additionally connected. Similarly, the wireless earphone/microphone device of the present invention may be detachably installed in the wired telephone and have the almost same effect.

Industrial Applicability

As apparent from the above description, the present invention provides a mobile telephone with a wireless earphone/microphone wherein an audio input/output device is removably installed in the body of the mobile telephone, thereby allowing the user to freely conduct a telephone conversation over the earphone and microphone, resulting in a

significant increase in convenience in use.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims:

1. A mobile telephone comprising a power supply for supplying predetermined direct current power to the mobile telephone, a main transmitter for transmitting an audio signal to an external mobile switching center at a first frequency, a main receiver for receiving an audio signal from said mobile switching center at a second frequency, and a communication signal processor for processing a voice from the user, outputting the resultant audio signal to said main transmitter, detecting said audio signal from said mobile switching center from said main receiver and processing the detected audio signal to convert it into an audible signal, wherein said mobile telephone further comprises:
- 15 an auxiliary transmitter for transmitting said audio signal from said main receiver processed by said communication signal processor at a third frequency;
- 20 wireless earphone/microphone means located at a remote site from said auxiliary transmitter and wirelessly connected thereto, said wireless earphone/microphone means receiving and demodulating said audio signal transmitted from said auxiliary transmitter, outputting the resultant voice to the user, modulating the voice from the user and transmitting the resultant audio signal at a fourth frequency; and
- 25 an auxiliary receiver for receiving said audio signal

transmitted from said wireless earphone/microphone means and transferring it to said communication signal processor.

2. The mobile telephone as set forth in Claim 1, wherein
5 said wireless earphone/microphone means includes:

a remote receiver for receiving said audio signal transmitted from said auxiliary transmitter;

an audio signal processor for demodulating said audio signal received by said remote receiver, processing the
10 demodulated audio signal as a voice and modulating the voice from the user at said fourth frequency;

a remote transmitter for transmitting said audio signal modulated by said audio signal processor at said fourth frequency;

15 an earphone for outputting the voice processed by said audio signal processor to the user;

a microphone for converting the voice from the user into an electrical signal and transferring the converted electrical signal to said audio signal processor; and

20 a charging circuit for charging itself with the power from said power supply and supplying the charged power to said remote transmitter, remote receiver, audio signal processor, earphone and microphone as needed.

25 3. A mobile telephone having a flip-type body including a

main transmitter, a main receiver and a communication signal processor, comprising:

audio input/output means installed in said body in such a manner that it is detachable from said body and movable to a desired remote site, said audio input/output means including a remote transmitter, a remote receiver, an audio signal processor, a microphone and an earphone;

a depressed seat formed at a desired portion of said body for receiving said audio input/output means; and

10 a stopper formed at a desired portion of said depressed seat for selectively attaching or detaching said audio input/output means to or from said seat.

4. The mobile telephone as set forth in Claim 3, further comprising:

a plurality of first power terminals formed at desired portions of said depressed seat for supplying power to said audio input/output means; and

20 a plurality of second power terminals formed respectively at the opposite portions of said audio input/output means to said first power terminals to be electrically contactable with said first power terminals to receive the power therefrom.

5. The mobile telephone as set forth in Claim 1, wherein
25 said auxiliary transmitter and auxiliary receiver are

connected to a speaking system in at least one of a movable body and a fixed body of a wireless telephone and wherein said wireless earphone/microphone means is detachably installed in a desired portion of said movable body.

5

6. The mobile telephone as set forth in Claim 1, wherein said auxiliary transmitter and auxiliary receiver are connected to a speaking system in a wired telephone and wherein said wireless earphone/microphone means is detachably
10 installed in a desired portion of said wired telephone.

AMENDED CLAIMS

[received by the International Bureau on 26 September 2000 (26 09 00);
original claim 1 amended; remaining claim unchanged (1 page)]

1. A mobile telephone having a flip-type body including a main transmitter, a main receiver and a
5 communication signal processor, the mobile telephone comprising:

audio input/output means which is detachable on said body, and includes a remote transmitter, a remote receiver, an audio signal processor, a microphone and an earphone;

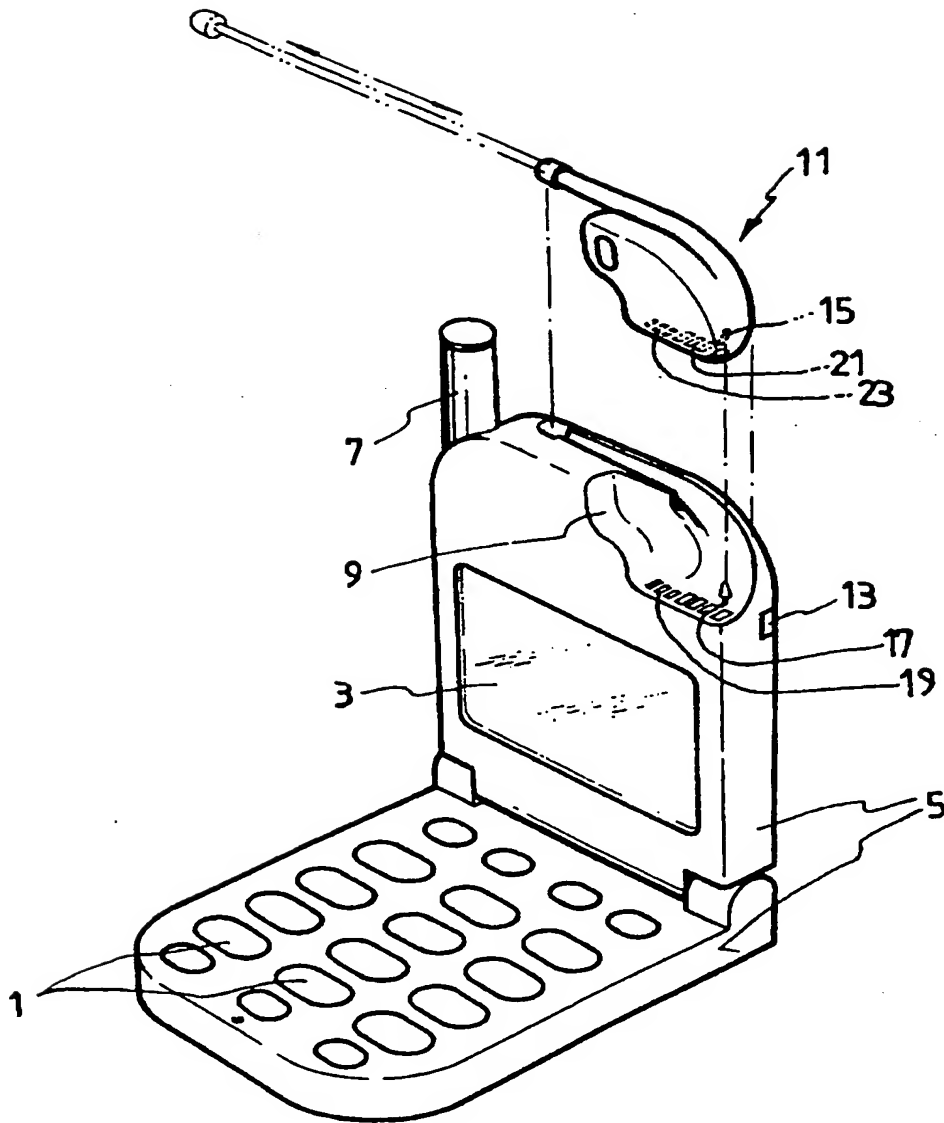
10 a depressed seat placed at an end of said body for receiving said audio input/output means;

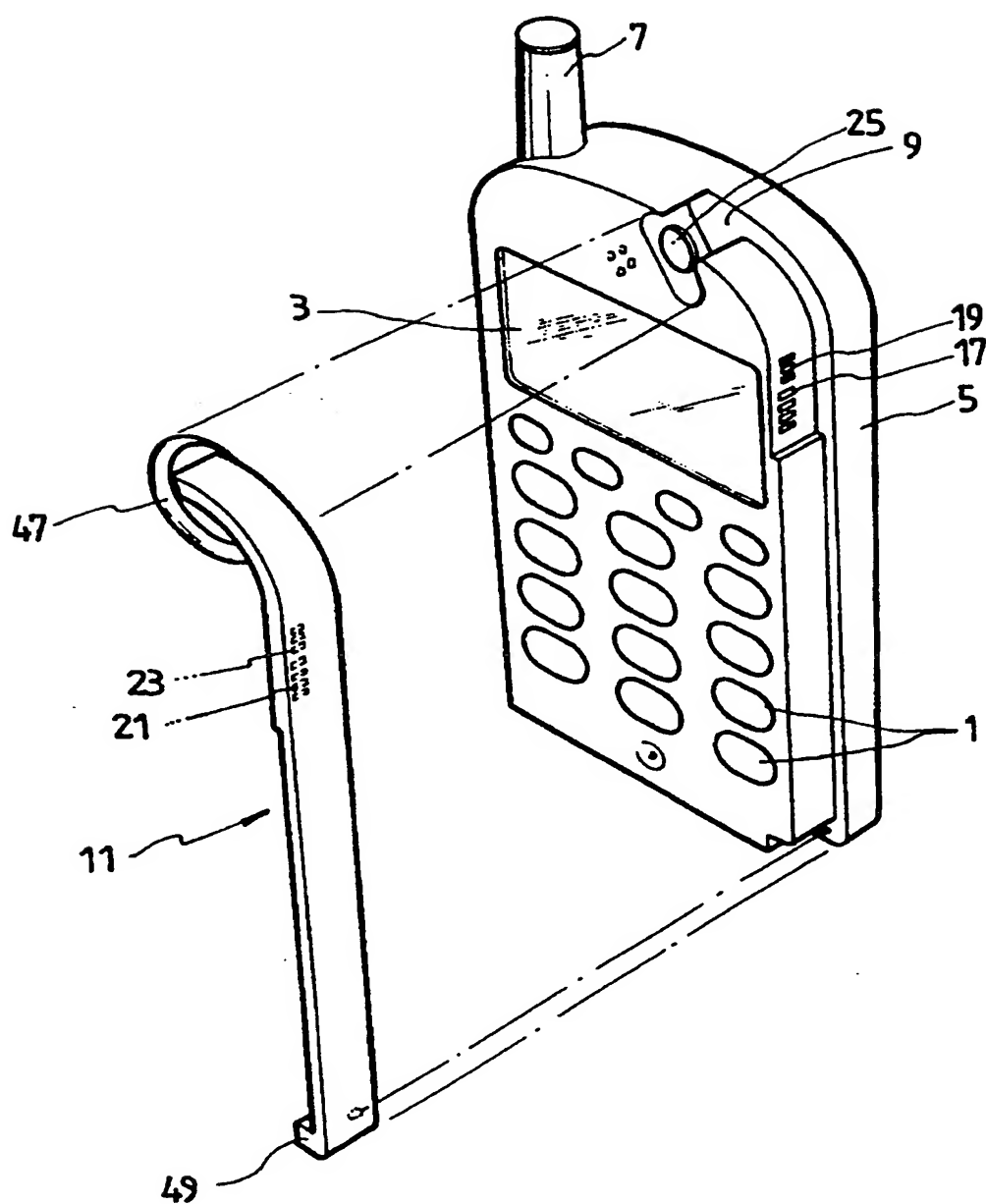
a stopper placed at an end of said depressed seat for selectively preventing detachment of said audio input/output means from said seat; and

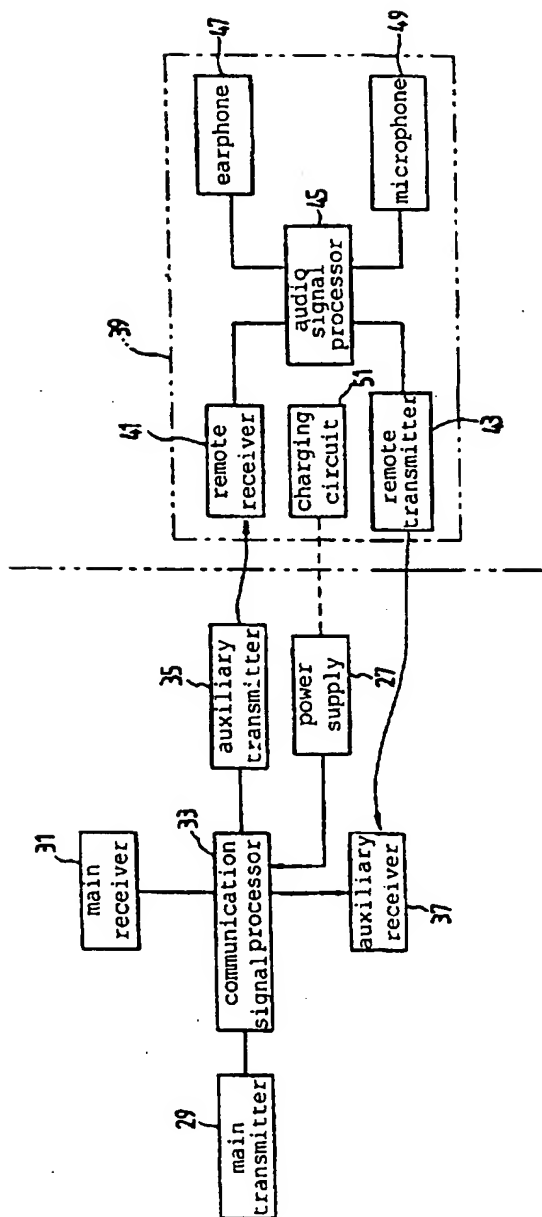
15 a resonant chamber, placed in an area of said earphone, for amplifying an audio signal provided from said earphone.

AMENDED SHEET (ARTICLE 19)

1/3
FIG. 1



2/3
FIG. 2

3/3
FIG.3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR00/00319

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 H04B 1/38**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B 1/38, 1/40, 7/26 ; H04M 1/00, 1/05 ; H04R 3/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Japanese Utility and application for Utility models since 1975

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FPD, PAJ, PATROM

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| Y | See Abstract and fig 4a, 5, 7 | 6 |
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| | See Fig 1-4 | |

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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19 JULY 2000 (19.07.2000)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/KR00/00319

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